

November 19, 2001, Strawman Draft, to be discussed at public workshop November 29 at 1:30 PM

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Comments are due Friday 12/14/01

The source-test methodology that was included in the Aug. 10 strawman has been struck out in this strawman.

MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS

REGULATION III - CONTROL OF AIR CONTAMINANTS

RULE 358 POLYSTYRENE FOAM OPERATIONS

SECTION 100 - GENERAL

- 101 **PURPOSE:** The purpose of this rule is to limit the emissions of volatile organic compounds (VOCs) from ~~expanding-expandable polystyrene (EPS), from manufacturing EPS foam products, and from the offgassing of VOC retained in the molded products.~~
- 102 **APPLICABILITY:** This rule is applicable to any facility ~~that expands EPS~~ for which the combined annual VOC emissions from the following, ~~combined,~~ total 5 tons or more: manufacturing EPS foam, storing expanded and/or raw EPS, making EPS foam products.

SECTION 200 - DEFINITIONS

- 2__ **BLOCK (EPS BLOCK)** – A block-shaped solid made of ~~monolithic~~ EPS (molded as a unit), typically having a width of at least 49 inches (1.25 M) and a length of at least 97 inches (2.6 M).
- 2__ **BLOWING AGENT** – Any substance that alone or in conjunction with other substances is capable of producing by inflation a cellular (foam) structure in a polymeric material. The main blowing agent in EPS ~~is~~ continues to be normal-pentane.
- 2__ **CUP MOLDING** – Making cups, bowls, and similar containers by molding EPS ~~prepuff~~ globules.
- 2__ **EMISSION CONTROL SYSTEM (ECS)** – A system, approved in writing by the Control Officer, designed and operated in accordance with good engineering practice to reduce emissions of volatile organic compounds. Such system consists of an emissions collection subsystem and an emissions processing subsystem.
- 2__ **EPS FOAM BOARD** – A rigid sheet of EPS foam that is a slice from an EPS ~~foam~~ block. For the purposes of this rule, a foam board product includes EPS foam board and those products made from EPS board.
- 2__ **EXPANDABLE POLYSTYRENE (EPS) MOLDING** – A series of processes in which EPS resin particles (beads), impregnated with blowing agent, undergo

expansion, aging, and then molding into a block, a cup, or a custom shape to form a low-density cellular foam product, typically between 0.4 and 5.0 lbs. per cubic foot (6.4 – 80 kg/M³).

~~2~~ **EXPANSION-DAY** – A calendar day beginning at midnight and ending 24 hours later, during which time at least 100 lbs. (45.4 kg) of raw EPS beads were expanded.

2 **FOAM (POLYMERIC FOAM)** – A solid material in a lightweight cellular form that has internal voids or cavities called cells that ~~are~~were made by introducing or generating gas bubbles throughout the material while it ~~is~~ was in a fluid or viscous state.

2 **NONPRECURSOR ORGANIC COMPOUND** – Any of the organic compounds which have been designated by the EPA as having negligible photochemical reactivity. EPA designates such compounds as "exempt". A listing of the compounds is found in Rule 100 of these Air Pollution Control Rules and Regulations.

2 **PEPS (PRE-USED EXPANDED POLYSTYRENE) (PRE-USED EPS) (PEPS)** – Expanded polystyrene product that has already served its initially intended use. This excludes EPS material that in its most recent generation occurred at an EPS-expanding facility as waste, scrap, surplus, defective product, quality-rejects, trimmings, or as an experiment. An example of PEPS is two broken halves of a used ice chest or shaped EPS packaging that has already protected a shipped item.

2 **PERMANENT TOTAL ENCLOSURE (PTE)** – An enclosure that meets all of the requirements of a *permanent total enclosure* in EPA Method 204, referenced in ~~subsection 507~~ Section 500 of this rule.

2 **POLYSTYRENE** – Any grade, class, or type of thermoplastic polymer, copolymer, interpolymer, alloy, or blend that is composed primarily of polymerized styrene monomer. Styrene monomer has the chemical formula **C₆H₅-HC=CH₂**.

2 **PRE-PUFF** – Expanded polystyrene ~~foam~~ globules, prior to molding.

~~2~~ **QUASI-TOTAL ENCLOSURE** – An enclosure that behaves like a total enclosure, having no air entering at less than 1 meter/second (200 feet per minute), having no detectable leakage, and meeting specifications of HVAC codes, but not necessarily exactly meeting all the descriptors of a total enclosure as written in EPA method 204. All natural draft openings are more than 4 equivalent openings away from any VOC source and the sum of all openings, including openings between momentarily gaping flaps of flapped covers, have a total face area less than 5.0% of the combined areas of floor, ceiling, and walls. [Method 204 mentions 4 walls rather than generalizing to include all wall surface, e.g., Method 204 does not mention round rooms or polygonal shapes that are not 4 contiguous sides.]

- 2__ **SHAPE, SHAPE MAKING** – Creating an object out of expanded polystyrene globules (prepuff) in a ~~special~~-mold (usually custom configured) that is neither a block mold nor a cup mold.

2 **VOC CONTENT** – For the purposes of this rule there are different expressions of the VOC content of raw EPS beads:

2 .1 **Actual VOC Content:** The percent or absolute mass of VOC in a sample of raw EPS beads, or of intermediate product, or of finished EPS product, at the current moment.

2 .1 **Bead Model VOC Content:** The typical VOC content of raw EPS beads, given by their manufacturer in its description of a particular bead model or, absent that, the midpoint of the range of VOC content given by the manufacturer for a bead model. For example, Nova Chemicals listed "4.2" (pounds of pentane per 100 lbs. of beads) as the "TYPICAL PENTANE LEVEL" for its model "M97B" beads.

2 .2 **Manufacturer's Certified VOC Content:** The VOC content provided on a certificate of analysis by a bead-manufacturer for a batch/lot of their newly made EPS beads.

2 .4 **Post-Manufacturer Laboratory-tested VOC Content:** The result of a laboratory test of the VOC content of a sample of raw beads, or of intermediate product, or of finished EPS product – conducted sometime after bead manufacture by a laboratory that typically is independent of the beads' manufacturer.

- 2__ **VOLATILE ORGANIC COMPOUND (VOC)** – Any organic compound that participates in photochemical reactions, except non-precursor organic compounds.

SECTION 300 – STANDARDS

301 ~~BLOCK MAKERS~~ **AND SHAPE MAKERS:**

301.4 ~~**Block-Making Emission Limits:** An EPS block-making facility shall be equipped with control devices such that at the operator-chosen, permanent maximum average rate of molding, maximum VOC content of raw beads, and minimum period of prepuff aging;~~

301.1 **Block-Making Emission Standards:** The Owner or Operator of an EPS block-making facility shall meet at least one of the following 3 standards in the course of processing raw beads to form molded EPS blocks:

- a. Limit the mass of VOC emitted plus the mass of VOC retained in all molded block made from these beads to no more than 3.00 lbs. of VOC per 100 lbs. of raw beads; OR

- b. Operate with an overall control of at least 75% according to the following formula; (exclude VOC emitted from a block after it is molded):

$$\frac{\sum \text{VOC}_{\text{into ECS}} - \sum \text{VOC}_{\text{out ECS}}}{\sum \text{VOC}_{\text{raw}} - \sum \text{VOC}_{\text{block}}} \geq 0.75$$

Where

$\sum \text{VOC}_{\text{into ECS}}$ is the amount of VOC detected/calculated entering the ECS.

$\sum \text{VOC}_{\text{out ECS}}$ is the amount of VOC detected/calculated exiting the stack of the ECS.

$\sum \text{VOC}_{\text{raw}}$ is the total amount of VOC in the beads processed.

$\sum \text{VOC}_{\text{block}}$ is the total amount of VOC retained in the freshly molded product.

– OR

- c. Emit no more than 0.70 lbs. of VOC per 100 lbs. of raw beads processed when tested with beads not exceeding 4.5% bead model VOC content, provided that less than 10% of the beads used exceed 4.5% bead model VOC content. This excludes VOC emitted by blocks after they are molded.

- ~~a. 2.90 lbs. of VOC per 100 lbs. of virgin bead if tested according to the "2-period" method set forth in §504.;;3.10 lbs. of VOC per 100 lbs. of virgin bead if tested according to the "clean-to-clean" method in §505 and §504.;;~~

- ~~b. If a facility that is equipped with an ECS served permanent total enclosure obtains a result in the "2-period test" that exceeds 2.90 but is not more than 3.10, the facility must do the following to stay on average below 2.90:~~

- ~~1) Use a proportion of PEPS and/or lower VOC beads, such that the 30-day average calculated per §402 is at least 10% lower on each day of bead expansion than it would be if only bead with the same VOC content as chosen for the test were used; and~~

- ~~2) The permanent total enclosure must be qualified as such by examination/testing and must totally enclose at least one of the~~

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~~following 3 operations: (pre)expansion, aging, or molding — with the vacuum line connected to an ECS.~~

~~301.2 Shape-Making Emission Limits:~~

- ~~a. An EPS shape-making facility shall conform to §301.1, that is, the same requirements as a block-making facility.~~

302 SHAPE MAKERS:

302.1 Shape Making Emission Standards: The Owner or Operator of an EPS shape-making facility shall meet at least one of the following 3 standards in the course of processing raw beads to form molded EPS shapes:

- a. Limit the mass of VOC emitted plus the mass of VOC retained in all molded shapes made from these beads to no more than 3.00 lbs. of VOC per 100 lbs. of raw beads; OR
- b. Operate with an overall control of at least 75% according to the following formula; (exclude VOC emitted from shapes after they are molded):

$$\frac{\sum \text{VOC}_{\text{into ECS}} - \sum \text{VOC}_{\text{out of ECS}}}{\sum \text{VOC}_{\text{raw}} - \sum \text{VOC}_{\text{shape}}} \geq 0.75$$

Where the first 3 terms have the same meaning as in §301.1b and

$\sum \text{VOC}_{\text{shape}}$ is the total VOC retained in all the freshly molded shapes.

– OR

- c. Emit no more than 0.70 lbs. of VOC per 100 lbs. of raw beads processed when tested with beads not exceeding 4.5% bead model VOC content, provided that less than 10% of the beads used exceed 4.5% bead model VOC content. This excludes VOC emitted by shapes after they are molded.

- ~~b. Prior to an efficiency test pursuant to §301.1a, the operator shall make a production plan that causes those shapes to be molded that together require the greatest production rate, in terms of mass throughput, that the operator desires be designated on the permit.~~

- ~~c. Prior to an efficiency test, the operator shall consult with the Division testing staff to determine the VOC content sampling schema of the shapes that will be made during the test.~~

302 303 CUP MAKERS: ~~{A source specific RACT analysis for the cup manufacturer is still under development.}~~

303.1 Cup Making Emission Standards: The Owner or Operator of an EPS cup-making facility shall meet at least one of the following 2 standards in the course of processing raw beads to form cups:

- a. Operate with an overall control of at least 81% according to the following formula; (exclude VOC emitted from cups after they are molded):

$$\frac{\sum \text{VOC}_{\text{into ECS}} - \sum \text{VOC}_{\text{out ECS}}}{\sum \text{VOC}_{\text{raw}} - \sum \text{VOC}_{\text{cup}}} \geq 0.81$$

Where the first 3 terms have the same meaning as in §301.1b and

$\sum \text{VOC}_{\text{cup}}$ is the total amount of VOC retained in the freshly molded cups.

OR

- b. Emit no more than 0.70 lbs. of VOC per 100 lbs. of raw beads processed when tested with beads not exceeding 4.5% bead model VOC content, provided that less than 10% of the beads used exceed 4.5% bead model VOC content. This excludes VOC emitted by cups after they are molded.

303 304 RECYCLED POLYSTYRENE LOOSE-FILL MANUFACTURING: Effective [date; 12 months after adoption], an Owner or Operator ~~person of an EPS facility~~ that ~~causes blowing agent to be injected in an extruder that~~ makes loose fill from recycled polystyrene shall install and operate an ECS according to the following:

303.1 304.1 The ECS shall have a capture efficiency of at least 50% by weight. ~~Capture and convey a mass of VOC, at least equal to 50% by weight of the total VOCs injected, to an emission processor that conforms to subsection 303.1a, following, and to 303.2.~~

304.2 The ECS shall have a ~~a.~~ A processing subsystem shall control device that reduces the weight of non-methane organic carbon in the VOC delivered to it by at least:

a.(1) 95% average for recuperative and for regenerative processors, OR reduce organic carbon to an average of no more than 50 mg/meter³ when inlet concentration is less than 1 gram/meter³ [1 mg/liter] ~~(1900 ppm molar volume);~~

b.(2) 98% average for other processors ~~(that are neither recuperative nor regenerative)~~, or reduce organic carbon to an average of no more

than 20 mg/meter³ when inlet concentration is less than 1 gram/meter³ [1 mg/liter] ~~(1900 ppm molar volume)~~.

- ~~303.2~~ **304.3** Install a monitoring system that continuously records the blowing agent injection rate(s) at all times during extrusion. Such monitoring devices, which include but are not limited to mass flow meters and recorders, shall meet the specifications of their manufacturer for accuracy and precision.

305 LIMITED USE OF HIGH-VOC SPECIALTY BEADS:

305.1 Conditions: An operator of a block making or shape making facility that meets the §301.1c standard or §302.1c standard may apply to the Division to include in its permit a provision to use up to 10% of high-VOC specialty beads, provided that the facility complies completely with recordkeeping requirements. This provision may not be renewed if daily records, kept according to §500, indicate that "Q" in formula N (in §305.4) exceeds 10% during any period of 30 consecutive expansion-days or if any required data due in such records are missing, incomplete, or erroneous.

305.2 Calculations Required if Using High-VOC Specialty Beads: Records and calculations are required on each expansion-day prior to commencing expansion if any high-VOC specialty beads are (to be) expanded during the current expansion-day or have been expanded in any of the past 30 expansion-days. These records and calculations shall be kept per §501.4.

305.3 Label: Each gaylord or other raw-bead container that contains high-VOC specialty beads shall be clearly labeled as such by the end of the day on which it is received at the facility, or by the end of the day on which it is separated from a bundle of containers at the facility.

~~304.3~~ **305.4 Averaging Offsets Using PEPS:** An operator of an EPS-expanding block making or shape making operation allowed by §305.1 to use high-VOC specialty beads is also allowed to use pre-used EPS PEPS foam to reduce increase the 30-expansion-day rolling-average total of all "beads" processed, according to Formula N.:

FORMULA N

$$Q = \frac{\sum B_{noncon30}}{\sum B_{per30} + 5 \sum B_{peps30} + \sum B_{noncon30}} < 0.10$$

Where

$\sum B_{noncon30}$ is the total mass of high-VOC specialty beads used in the past 30 expansion-days.

$$\sum B_{per30}$$

is the total mass of beads not exceeding a bead model
VOC-content of 4.5% that have been used in the past 30
expansion-days.

$$\sum B_{per30}$$

is the total mass of PEPS used in the past 30 expansion-
days. PEPS is weighted with a factor of 5 because of its
low VOC content (averages less than 0.15%).

A default VOC-content value of 0.2 percent VOC shall be used for such foam, or VOC content
data from laboratory analysis, done per owner/operator request and expense by a
testing firm acceptable to the Division Manager, in accordance with Section 500,
may be used instead.

306 SOURCE TESTING PARAMETERS AND RESULTS: When source testing EPS
facilities to determine compliance with the emission standards of this rule, the
Emission Control System(s) shall be tested using production characteristics that
result in the highest rate of pre-control VOC-emission. These characteristics shall
include bead VOC content, density of prepuff, rate of production, and properties of
the polymer.

§305-

304 CONTROL MEASURES FOR EPS FACILITIES:

304.1 No later than February 1, 2003, all emission control equipment necessary
to meeting the requirements of this rule or a permit shall meet the
standards of both the *American Conference of Government Industrial
Hygienists* and *Uniform Fire Code*. This includes but is not limited to
ducting, hoods, enclosures, and support systems and the methods and
parameters within which such equipment is operated.

304.2 307 Emissions from Aging EMISSIONS FROM AGING: The emission control system
serving prepuff aging spaces, including but not limited to rooms, silos, and bags,
shall be maintained at a level of control:

307.1 By {date, 2 years after rule adoption} all prepuff being aged shall be
confined to a permanent total enclosure served by an ECS.

307.2 In a permanent total enclosure, the level of envelope integrity (floor, sides,
ceiling, etc.) shall be maintained to keep the VOC level 1 foot outside the
external surface of the enclosure and at all heights above the floor at less
than 2% LEL above ambient whenever prepuff is present within such
enclosure.

307.3 Performance of Prepuff Emission-Processor: A processing subsystem
(control device) of an ECS serving a prepuff aging space shall reduce the
weight of non-methane organic carbon in the VOC delivered to it from
prepuff aging space by at least 94% OR reduce organic carbon to no more
than 50 mg/meter³ when inlet concentration is less than 1 gram/meter³.

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~~_____ a. No less than was used in the successful completion of the efficiency test pursuant to §301 of this rule~~

~~_____ b. Whenever neither (pre)expansion nor molding is happening,~~

~~_____ 1) No less than 81% overall (except for an aging operation within a permanent total enclosure).~~

~~**304.3 Performance of Emission Control System (ECS):** A processing subsystem shall reduce the weight of non-methane organic carbon in the VOC delivered to it from prepuff aging space by at least 95% OR reduce organic carbon to no more than 50 mg/meter³ when inlet concentration is less than 1 gram/meter³ [1 mg/liter] (1900 ppm molar volume);~~

305 308 FURTHER ECS REQUIREMENTS:

~~305.1.~~ **308.1 Operation Andand Maintenance (O&M) Plan Required For Anan ECS:**

a. An owner/operator shall provide, implement, and maintain an O&M Plan for each ECS, any other emission processing equipment, and any ECS monitoring devices that are used pursuant to this rule ~~or to an air pollution control permit.~~

b. The owner/operator shall submit to the Control Officer for approval the O&M Plans of each ECS and each ECS monitoring device that is used pursuant to this rule.

~~_____ c. The O&M Plan shall also include limits on the production characteristics that correlate with the operating parameters established for the ECS during the initial source test demonstrating compliance with this rule.~~

~~e.~~ **d. O&M Plan Responsibility:** An owner or operator of an EPS facility must comply with all O&M Plans that the owner or operator has submitted for approval but which have not yet been approved, unless notified otherwise by the Control Officer in writing. The owner/operator shall comply with all the identified actions and schedules provided in each O&M Plan.

~~305.2.~~ **308.2 Installing and Maintaining ECS Monitoring Devices:** Any person incinerating, adsorbing, or otherwise processing VOC emissions pursuant to this rule shall properly install and maintain in calibration, in good working order and in operation, devices described in the facility's O&M Plan that indicate temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained. Records shall be kept pursuant to Section 500. ~~Within the purview of RACT, monitoring methods and equipment shall be chosen that most nearly demonstrate that the ECS meets the overall control standard required by this rule's provisions.~~

309 VOC CONTAINMENT AND DISPOSAL:

309.1 All fresh and used VOC-containing material, including but not limited to cleaning solvents, inks, coatings, thinners, and rags having such materials or their residues on them, as well as VOC-containing residues themselves, shall be stored in closed, leak free, legibly labeled containers when not in use; AND

309.2 In addition, the owner or operator must implement handling and transfer procedures to minimize spills during filling and transferring such material (listed in §309.1) to or from enclosed systems, vats, waste containers, and other equipment that hold or store such material(s), whether it is fresh, used, or waste.

306 310 EXEMPTIONS: ~~Exemption from subsections 301 through 305:~~

310.1 Any facility that both expands less than 1,438,850 lbs. of EPS ~~raw material/beads~~ per year and emits less than 50 tons per year ~~of VOC, prior to emission control~~, from all EPS-related activities is exempt from subsections 301 through ~~305~~ 308.2, inclusive. ~~[1,438,850 lbs. of 7%-VOC beads, expanded and molded and stored until all offgassing ceases at a permanent residual of 0.05% VOC, emits 50 tons of VOC.]~~

310.2 **Burden of Proof:** A person claiming any exemption from this rule or from a provision of this rule shall provide adequate records such as raw material used, laboratory analyses, technical data sheets, or source test results to verify and maintain any exemption.

~~**306.1** **Limited Exemption:** A facility that has never been subject to §301 or §302 of this rule shall remain so, as long as the total VOC (as stated in the manufacturers specification) in all beads expanded in any calendar year does not exceed 25 tons.~~

~~**306.2** Any facility that both expands less than 1,438,850 lbs. of EPS per year and emits less than 50 tons per year from all EPS-related activities is exempt from subsections 301 through 305. ~~[1,438,850 lbs. of 7%-VOC beads, expanded and molded and stored until all offgassing ceases at a permanent residual of 0.05% VOC, emits 50 tons of VOC.]~~~~

SECTION 400 - ADMINISTRATIVE REQUIREMENTS

401 COMPLIANCE SCHEDULE: A person subject to this rule shall submit to the Control Officer an application for a modified permit revision for any new or modified equipment to be used to achieve compliance with this rule at least 90 days prior to the startup date or the intended startup date of the new or modified equipment. A person subject to this rule shall comply with the following increments of progress:

401.1 By (date 4 months after date of adoption), submit to the Control Officer an application for a permit revision to install and operate equipment to be used to achieve compliance with this rule.

401.2 By (date 1 year after date of adoption), complete the installation of all equipment and complete the initial source test documenting compliance with this rule.

401.3 By (date 14 months after date of adoption), submit an application for a permit revision to incorporate limits for the production characteristics that correlate with the ECS operating parameters established by the initial source test.

401.4 By (date 14 months after date of adoption), submit an update to the O&M Plan to include limits for the production characteristics that correlate with the ECS operating parameters established by the initial source test.

503 **Burden of Proof:** A person claiming any exemption to this rule must have the information available that would allow the Control Officer to verify eligibility for the exemption, such as raw material used, laboratory analyses, technical data sheets, or source test results.

~~**402 FORMULA TO DETERMINE THE ROLLING 30-DAY AVERAGE VOC CONTENT OF EPS BEADS:** If the average VOC content of all the EPS beads used facility-wide during T_{BeDay} , the most recent 30 consecutive days during which EPS was expanded, is to be calculated pursuant to a provision of this rule, use the following equation. This calculation is required in order to comply with certain block and shape standards in Section 300. The result is expressed in percent VOC.~~

$$\text{VOC}_w = \frac{[M_1 C_1 + M_2 C_2 + \dots + M_n C_n + 0.2 M_{\text{PEPS}}]}{[M_1 + M_2 + \dots + M_n + M_{\text{PEPS}}]} \times 100$$

where:

VOC_w = The weighted average percent VOC content of all "n" batches of beads (#"1" through #"n") used during T_{ExDay} throughout the facility, expressed in fractional lbs. VOC per 1 lb. of beads.

C_1 = The VOC content of the first bead batch used during T_{ExDay} , expressed in fractional lbs. VOC per 1 lb. of beads.

C_2 = The VOC content of the second bead batch used during T_{ExDay} , expressed in fractional lbs. VOC per 1 lb. of beads.

C_n = The VOC content of the very last bead batch used in T_{ExDay} , expressed in fractional lbs. VOC per 1 lb. of beads.

M_1 = The total mass of bead batch #1 used in T_{ExDay} expressed in lbs. VOC.

- ~~M_2 = The total mass of batch #2 used in T_{ExDay} expressed in lbs. VOC.~~
- ~~M_n = The total mass in lbs. of the last bead batch used in T_{ExDay} , during which time beads from "n" different batches were used.~~
- ~~M_{EPS} = The total mass of pre-used expanded polystyrene used during T_{ExDay} .~~

SECTION 500 - MONITORING AND RECORDS

- 501 ~~Records~~**RECORDS**: Effective [date: 3 months after adoption], a person subject to this rule shall comply with the following requirements, as applicable. Required records shall be retained for at least 5 years. Information that a facility already records for its own purposes is acceptable to meet the requirements if it contains all the required information and in a format implied by the requirements below. It is not acceptable, for example, for data that needs to be formatted together to be listed only on separate sheets.
- 501.1** An owner or operator shall obtain and retain a certificate of analysis for every lot-number of beads received. This certificate shall either be from the manufacturer or a testing firm acceptable to the Air Quality Division.
- 501.2** Each workday, maintain a ~~current~~ log that lists/records the following information together: The date and, for each bead lot received, the date received, the manufacturer, the model number, the lot number, and the quantity of that lot received.
- ~~a. Cause a certificate of analysis to accompany every batch or cause analysis of VOC content to be made for each batch missing a certificate of analysis, at a testing firm acceptable to the Air Quality Division.~~
- ~~b. Record the amount of polystyrene and blowing agent in each resin batch used, expressed as percent by weight.~~
- 501.2** **501.3** Maintain daily records of the total weight of each type of bead processed and the hours of operation of each expander and each molder.
- ~~**501.3** Facilities that use the rolling average to comply with §301.1b shall have computed and recorded the rolling average prior to commencing a day's bead expansion.~~
- 502 ~~ECS~~**RECORDKEEPING REQUIREMENTS**: ~~A person operating an ECS to comply with this rule shall record key system operating parameters such as temperature, flow rate, and pressure on a daily basis.~~
- 502.1** **General:** Recordkeeping processes shall be complete, up-to-date, and of consistent and legible format such that the bead-model VOC content of

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beads being expanded, the beads' minimum aging parameter, if stated (e.g., in the O&M Plan), and actual current aging-times will be readily apparent. If the records demonstrate that the average aging period was less than the minimum aging period by 10% or more, that situation shall constitute a violation and/or exceedance.

502.2 Records and Calculations For High-VOC Specialty Beads: For §305-eligible owners or operators, on each expansion-day that high-VOC specialty beads are (to be) used and on each expansion-day within 30 expansion-days of the last use of high-VOC specialty beads, the following calculations and record-entries are required prior to commencing expansion.

a. Update the following running-totals of beads expanded over the past 30 consecutive expansion-days:

1) Total mass of all beads expanded.

2) Total mass of all beads expanded that have a bead model VOC-content of 4.5% or less.

3) Total mass of all beads expanded having bead model VOC contents above 4.5%.

4) If you have made product using a proportion of PEPS in the past 30 expansion-days, calculate the total of such PEPS so used.

b. Calculate and list/display the quotient obtained by carrying out the calculations of Formula N (in §305.4).

502.3 A person operating an ECS to comply with this rule shall record key system operating parameters such as temperature, flow rate, and pressure on a daily basis.

~~**503 Burden of Proof:** A person claiming any exemption to this rule must have the information available that would allow the Control Officer to verify eligibility for the exemption, such as raw material used, laboratory analyses, technical data sheets or source test results.~~

503 ~~**506**~~ **TESTING PROCEDURES FROM FORMAL REFERENCES:** A source shall be in violation if the VOC emissions, measured by any of the referenced test methods, exceed the standards of this rule.

506.1 **503.1 Analysis of Samples:** The VOC content and exempt compound content of raw polymerized materials subject to this rule shall be analyzed using Bay Area Air Quality Management District (BAAQMD) Manual of Procedures, Volume III, Method 22 and Method 45, as cited in subsection ~~507~~ **504**.

506.2 **503.2 Determination of Emissions:** The capture and control efficiency of an ECS as referenced in subsections 301 and 302 shall be measured by Environmental Protection Agency (EPA) Method 25 or 25A or by alternative South Coast AQM District methods. When either EPA Method 25 or 25A is used, capture efficiency shall be determined according to EPA's

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"Guidelines for Determining Capture Efficiency," January 9, 1995 and/or 40 CFR 51, Appendix M, Methods 204 - 204F, as applicable. Methods 25, 25A, and the 204 series are referenced in §~~504~~~~507~~. South Coast AQMD Method 25.3 may be selectively used for testing for low levels of VOC at the outlet of an ECS. Method 25.3 is referenced in §504.

~~506.3~~ 503.3 **Airflow:** Airflow in an ECS shall be determined by EPA Methods 2, 2a, 2c, and/or 2d, as applicable. These are referenced in §504 ~~507~~.

504 ~~507~~ **TEST METHODS:**

504.1 **Test Methods of the Bay Area Air Quality Management District:**

~~507.1~~ a. BAAQMD Manual of Procedures, Volume III, Method 45, "Determination of Butanes and Pentanes in Polymeric Materials".

~~507.2~~ b. BAAQMD Manual of Procedures, Volume III, Method 22, "Determination of Compliance of Volatile Organic Compounds for Solvent Based Coatings".

~~507.3~~ 504.2 **EPA Methods:**

- a. EPA Methods 2 ("Determination of Stack Gas Velocity and Volumetric Flow Rate"), 2a ("Direct Measurement of Gas Volume Through Pipes and Small Ducts"), 2c ("Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts"), and 2d ("Measurement of Gas Volumetric Flow Rates in Small Pipes and Ducts") (40 CFR 60, Appendix A).
- b. EPA Method 18 ("Measurement of Gaseous Organic Compound Emissions by Gas Chromatography") and its submethods (40 CFR 60, Appendix A).
- c. EPA Method 25 ("Determination of Total Gaseous Nonmethane Organic Emissions as Carbon") and its submethods, including Method 25A ("Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer") (40 CFR 60, Appendix A).
- d. EPA Test Method 204 ("Criteria For and Verification of a Permanent or Temporary Total Enclosure"), 204a, 204b, 204c, 204d, 204e, and 204f (40 CFR 51, Appendix M).

504.3 **South Coast AQMD Method: District Method 25.3, *Determination Of Low Concentration Non-Methane, Non-Ethane Organic Compound Emissions From Clean Fueled Combustion Sources*, South Coast Air Quality Management District, Monitoring and Analysis (section), by M. Garibay and staff, March 2000. This is presently (11/01) deemed a "conditional method" by EPA.**

TESTING PROTOCOLS IN THE AUGUST 10 DRAFT HAVE BEEN REMOVED.

~~**504 TESTING PROCEDURES for BLOCK and for SHAPE**~~

~~[[Note: Each of these 2 alternative tests sets forth absolute conditions for testing. If, within the regime of such absolute test conditions, a facility passes a test far surpassing the control required by the rule, the Division Manager may allow (or refuse) in the permit conditions greater latitude than is allowed in the test. However, no latitude shall be allowed that detracts from certainty of compliance.]]~~

~~Either test reflects 3 basic decisions that the operator of an EPS facility must make. One is the **minimum length of the prepuff aging period**. The chosen period length shall be the only one used throughout either test and shall be made a permanent and absolute limit in the facility's permit if the test is passed; this is so until and unless the facility later passes the test using a shorter aging period.~~

~~The second basic decision is selection of the **production rate**. This is the rate at which the test will be run and the rate limit set on the facility's permit. Both the (pre)expansion and the molding must be capable of this rate simultaneously. This is because one phase of either test will be conducted with molding and expansion proceeding at the same rate for a length of time equal to the chosen prepuff aging period.~~

~~The third basic decision is selection of the **maximum VOC content of the raw beads**. If the test is passed, the limit to VOC content that will be included in the permit will be the actual VOC content of the beads at the time of the test, not the VOC content stated by the manufacturer. (An averaging provision is included in the rule, but is allowed only for facilities that nearly meet the standard using the highest VOC beads they will ever use.)~~

~~The first test, the simpler of the two, is the "2-period test". The second test is an elaboration of the first test; it is called the "clean-to-clean test" and lasts about 50% longer than the "2-period test". However, the standard imposed on the "clean-to-clean" test is not as strict as the "2-period test". One may choose either test. Because the 2-period test is included in the clean-to-clean test, it is possible to pass the "2-period test" in the course of conducting the "clean-to-clean" test~~

~~The "2-period test" will consist of a preconditioning phase and a measurement phase.~~

~~**TESTING BASES:** All raw materials used are weighed at onset of use. A steady state of prepuff production is maintained for a time period equal to twice the minimum aging period of prepuff chosen by the facility. After a time period equal to the minimum aging period (T_{age}) of prepuff, the molding operation is begun and is operated at exactly the rate operated at through T_{age+} . Measurements of control device inlet and outlet concentrations of VOC are made throughout the steady-state production period T_{age2-} . Standard EPA approved VOC and duct flow measurement methods are used.~~

~~Representative sampling of freshly made blocks (or shapes) is conducted during periods statistically "spaced" throughout T_{age2-} to determine quantity of VOC within them. Each block is weighed. For example, the block is cut and samples excised from the face of the cut, taking samples from the center, from near the outside, and from one or more representative points in~~

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~~between the two. Samples are taken as close to the time of weighing as is possible. (Weighing methods for shapes must be worked out, depending on the situation.)~~

~~When molding begins and throughout the molding period, the average age of prepuff in aging room is maintained at $T_{age}/2$ and the total mass of aging prepuff is kept quasi-constant. The same mass of beads is expanded hourly and overall during T_{age1} as in T_{age2} . Therefore, the prepuff made during T_{age2} , replaces exactly the aged prepuff being molded and the average age and age distribution of prepuff remains the same throughout T_{age2} .~~

~~Total VOC Emitted = [(Total bead mass expanded during T_{age2}) x (bead VOC content)] - [total VOC into control device during T_{age2}] - [total VOC in molded product made in T_{age2}] + [total VOC out of control device during T_{age2}].~~

Determination of compliance:

~~[Total VOC emitted + total VOC in molded product]/mass of beads expanded in T_{age2} x 100] - 2.9~~

Discussion of the factors used in the mass balance calculation.

~~**Total VOC into control device during T_{age2} :** this VOC comes from (1) current expansion activities, i.e., in T_{age2} and (2) from the molding of prepuff made during the preconditioning period T_{age2} , and (3) from the aging of prepuff made during T_{age1} , and (4) increasingly from prepuff made during T_{age2} as T_{age2} progresses; at the beginning of T_{age2} , all VOC from aging comes from prepuff made during T_{age1} . At the end of T_{age2} , all VOC from aging comes from prepuff made during T_{age2} ; in the middle of T_{age2} , approximately half of the VOC emitted by aging comes from prepuff made during T_{age1} and half from prepuff made during T_{age2} .~~

~~**Total VOC in new Blocks:** all from prepuff expanded during T_{age1} .~~

~~**Total VOC out of control device:** Measured by standard test methods and using a recording device.~~

~~**START CLEAN:** The facility must start the preconditioning phase of the test "clean", with no stored prepuff, with no EPS litter, and with any emissions from post-molding product separated from the VOC-capture mechanisms of prep, mixing, expanding, aging, and molding operations.~~

~~**PRODUCE AT A STEADY RATE:** Critical to the test is maintaining a steady average age of the prepuff being molded. This is done by both producing it at a steady rate and molding it at the same steady rate. The test is void if the molding operation does not match the rate of the expansion operation. Assuming a facility can produce prepuff at a rate faster than it can mold it, the rate of prepuff making must be geared to the maximum rate that the molding operation can maintain over a several hour period. Whatever the rate of molding during the test will be the maximum rate allowed on the permit.~~

~~**USE HIGHEST VOC CONTENT BEADS EVER INTENDED:** At least one complete test cycle shall be performed using only beads containing the highest actual VOC percent that will ever be used. For example, if it is intended that a facility be permitted to use 6.5% VOC beads, they must obtain sufficient lots of beads that actually have a least 6.46% VOC for the test, not simply beads that say 6.5% on the manufacturer's certificate of analysis.~~

~~**ALL BULK PACKAGES ARE SAMPLED:** A statistical sampling for VOC content determination must be made of each bead lot used during the tenure of the test, which can include the preconditioning part of the test if the packaging is resealed after sampling. Beads that were packed near the surface of the bulk package and beads packed near the center must be included. It is strongly suggested that the lots to be used during the test be sampled and tested for VOC content in advance to assure they have requisite VOC content desired by the facility.~~

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~~THE BEAD AGING PERIOD SHALL BE NO SHORTER THAN THE SHORTEST AGING PERIOD TO BE ALLOWED BY THE PERMIT:~~ In general, the shorter the aging period, the greater the amount of VOC that will be retained by a molded product, all other things being equal. By the same token, the longer the aging period, the more VOC dissipates out of the prepuff, VOC that is more easily captured and controlled than is the VOC dissipating from the molded product. For this reason, a single aging period length must be chosen for the duration of the test and that period will also be the minimum aging period allowed by the permit.

~~505 CLEAN-TO-CLEAN TEST:~~ The alternative test is similar to the basic test, except it includes a third time period equal to each of the first 2 periods, and requires that the VOC measurements in and out of the control device must proceed intact throughout the entire time of the test, i.e., the 3 consecutive time periods. This is a clean-to-clean mass balance test. In addition to the clean start of the basic test and the steady state period, (pre)expansion is then terminated and molding of the remaining prepuff proceeds until no prepuff remains. Block (or shape) VOC content is tested throughout. This can be a very long test. For example, if the minimum aging period chosen is 20 hours, monitoring of VOC captured must proceed for 60 consecutive hours. If the test is successfully completed and passed, a slightly higher emission proportion is allowed by this rule. This format of testing allows greater certainty of mass balances calculations than does the 2-period test, because all polymer inputs are used up and weighed as freshly molded product. All material that escapes, but for quality control reasons cannot be molded, must be pooled. If there is much of it, it must be weighed and sampled for VOC content. The basic formula to determine compliance is the same as in the 2-period test.